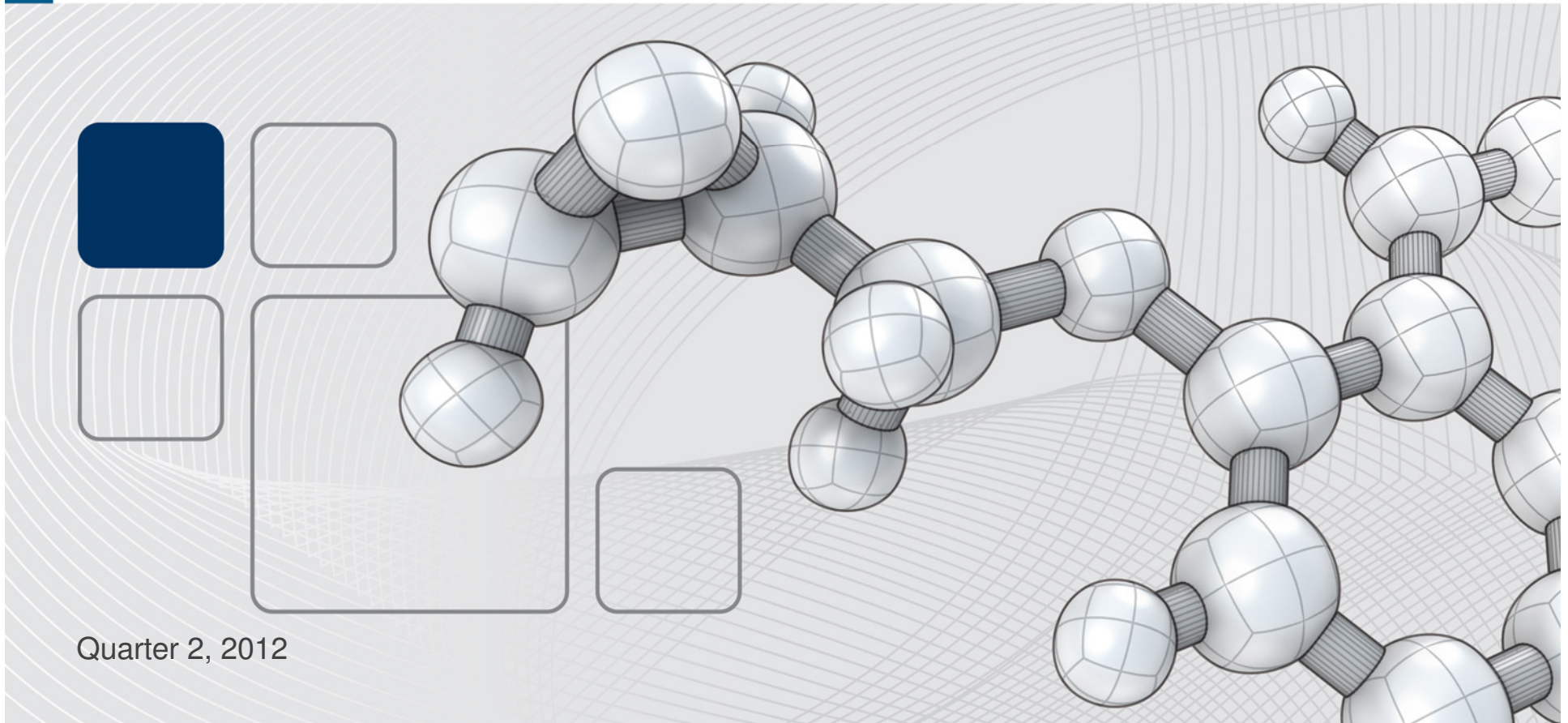




Advanced Materials

Raising insulation performance with advanced chemistries



Quarter 2, 2012

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Epoxy systems

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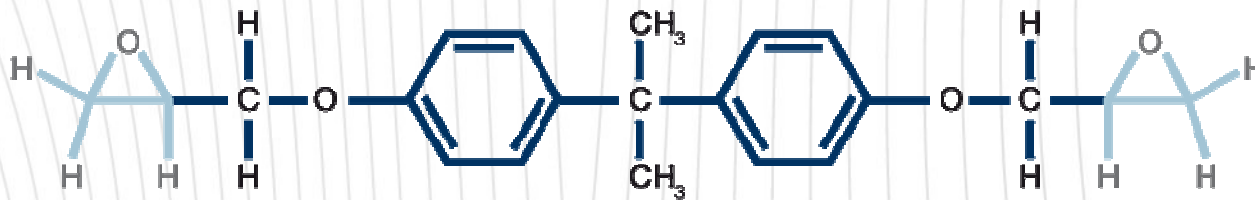
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Epoxy systems >

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Chemistry



Main features and benefits

- Ambient and hot curing systems
- Long pot life, latency
- Excellent cross linking
- Excellent impregnation
- High voltage behavior on impregnated parts
- High T_g
- Thermal endurance, high temperature applications
- Long-term reliability

Polyurethane systems

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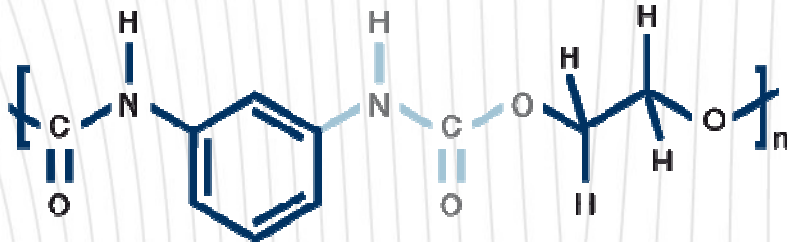
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Chemistry



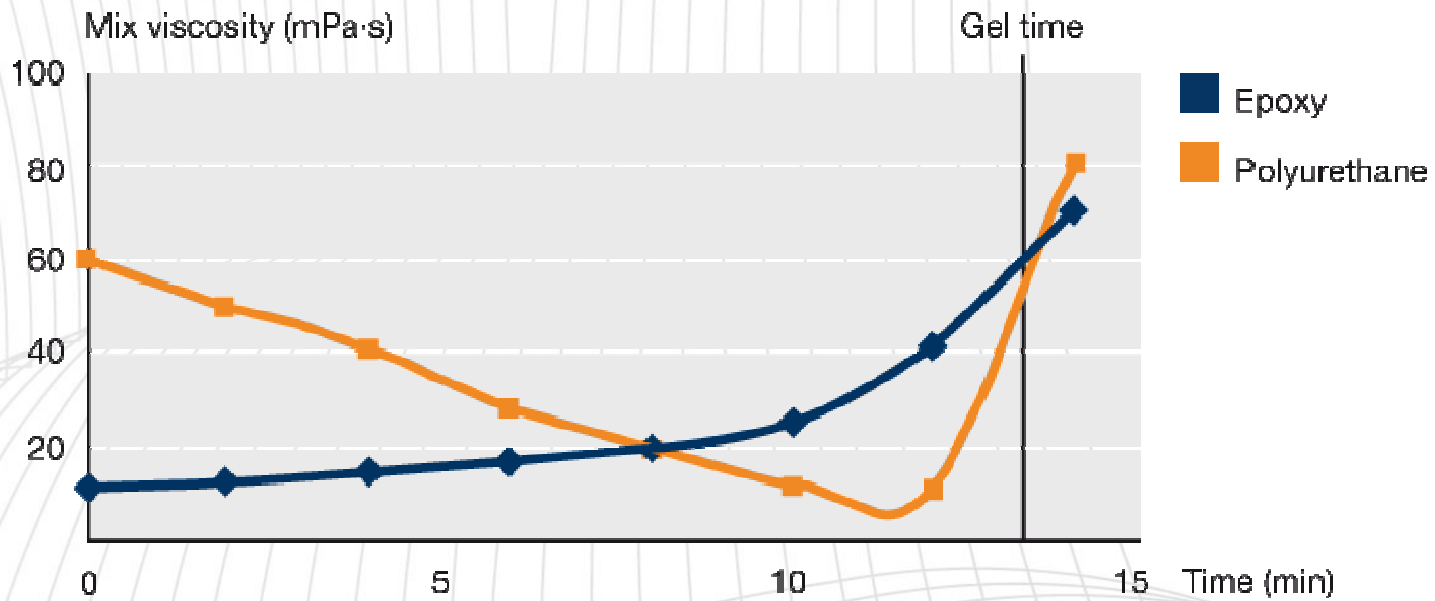
Main features and benefits

- Flammability resistance
- Low viscosity and easy processing
- Low exothermic reaction and low shrinkage
- Reactivity can be easily adjusted
- Flexibility at medium and low temperatures
- Suitable for pressure sensitive devices
- Crack resistance
- Thermal cycling
- Casting of big volumes
- Good adhesion
- Lower cost of materials

Compared viscosity

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Viscosity progression



Compared viscosity

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Epoxy resins

- Higher viscosity ca. 10 000 - 16 000 mPa.s
- Reduction of viscosity through reactive diluents or plastisizer

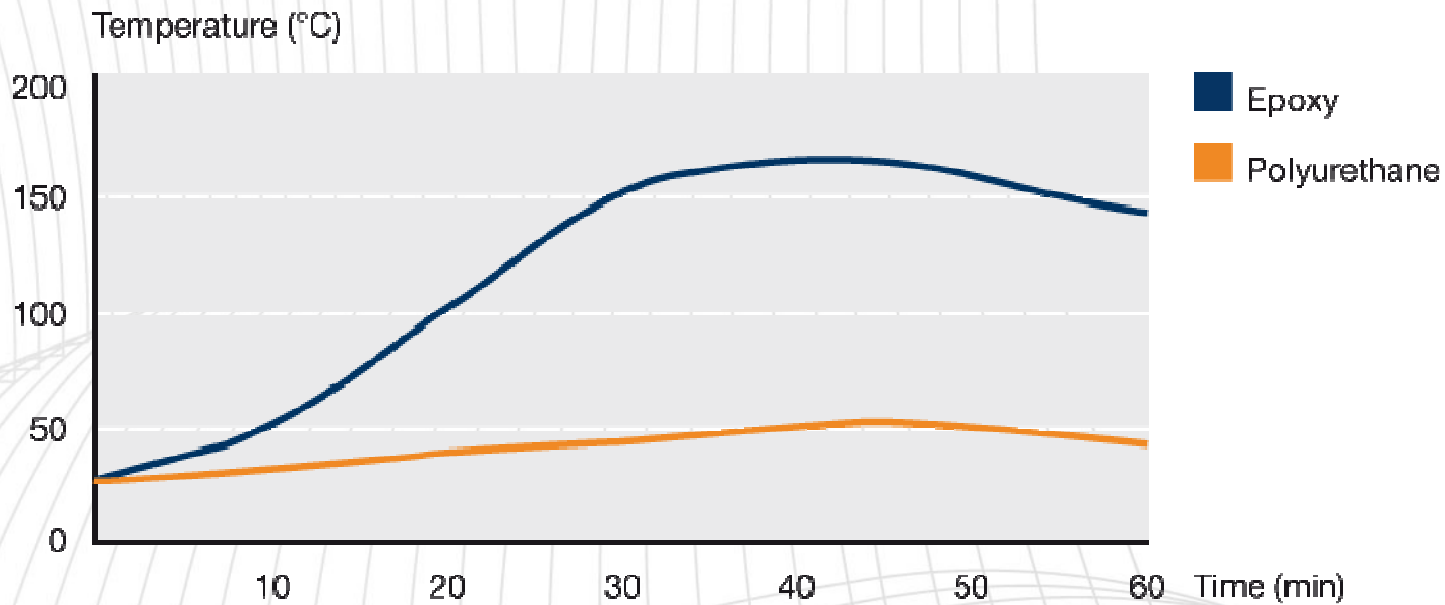
PU systems

- Much lower viscosity of polyols \ll 10 000 mPa.s
- Low viscosity of standard MDI $<$ 250 mPa.s
- Further dilution not required in most cases
- Low mix viscosity with excellent flowability

Compared exothermic reaction

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Exotherm progression



Compared exothermic reaction

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General rule for epoxy and polyurethane

- Exotherm of PU << EP systems
- Unfilled systems show stronger exothermic reaction
- Pot life of bigger quantities of reaction mix is lower
- Casting of big volumes preferably with PU
- PU's are less sensitive towards crack formation
- The use of PU prepolymers provides additional reduction of the exotherm
- Exothermic reaction has an impact on shrinkage

Compared chemical resistance

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Depends on

- Building blocks
- Crosslinking density and degree of conversion
- Hard systems show a better resistance than soft systems

General rule for epoxy and polyurethane

- Concentrated acid and base destroy the material
- Polar solvents damage the material
- Good resistance against diluted acid and bases, apolar solvents and fuel
- Aromatic solvents cause swelling of the material

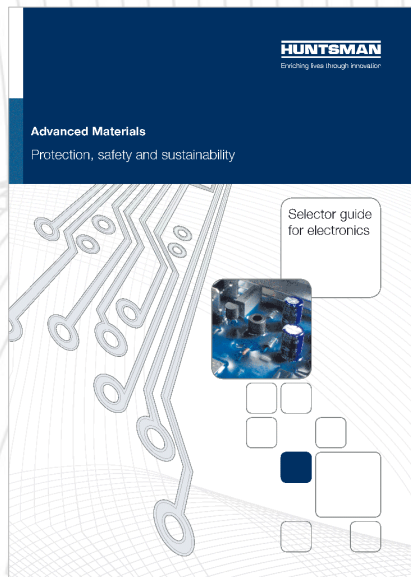
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